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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 09/560,469
Filing Date: April 28, 2000
Appellant(s): FERNANDO ET AL.

Salvatore A. Sidoti
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed April 20, 2011 appealing from the Office action mailed May 19, 2010.

(1) Real Party in Interest

The examiner has no comment on the statement, or lack of statement, identifying by name the real party in interest in the brief.

(2) Related Appeals and Interferences

The following are the related appeals, interferences, and judicial proceedings known to the examiner which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal:

Appeal No. 2005-0979 for Application No. 09/560,469, decided on June 7, 2005.

(3) Status of Claims

The following is a list of claims that are rejected and pending in the application:

Claims 1, 2, 5-13, 16-27, 41-44 and 47-57

(4) Status of Amendments After Final

The examiner has no comment on the appellant's statement of the status of amendments after final rejection contained in the brief.

(5) Summary of Claimed Subject Matter

The examiner has no comment on the summary of claimed subject matter contained in the brief.

(6) Grounds of Rejection to be Reviewed on Appeal

The examiner has no comment on the appellant's statement of the grounds of rejection to be reviewed on appeal. Every ground of rejection set forth in the Office action from which the appeal is taken (as modified by any advisory actions) is being maintained by the examiner except for the grounds of rejection (if any) listed under the subheading "WITHDRAWN

REJECTIONS." New grounds of rejection (if any) are provided under the subheading "NEW GROUNDS OF REJECTION."

WITHDRAWN REJECTIONS

The following grounds of rejection are not presented for review on appeal because they have been withdrawn by the examiner.

1. The rejection of claims 1, 2, 5, 6, 8-13, 16, 17, 19-27, 47-50 and 52-57 under 35 U.S.C. 103(a) as being unpatentable over Robinson et al. (US 5,580,532) in view of Myles (US 4,240,833).

2. The rejection of claims 7, 18, 41-44 and 51 under 35 U.S.C. 103(a) as obvious over Robinson et al. (US 5,580,532) in view of Myles (US 4,240,833), as applied to claims 1, 9, 12 and 21, and further in view of Sasaki et al. (JP 07-286514).

NEW GROUND(S) OF REJECTION

1. The rejection of claims 1, 2, 5, 6, 8-13, 16, 17, 19-27, 47-50 and 52-57 under 35 U.S.C. 103(a) as being unpatentable over Robinson et al. (US 5,580,532) in view of Myles (US 4,240,833) and Langer (US 5,250,269).

2. The rejection of claims 7, 18, 41-44 and 51 under 35 U.S.C. 103(a) as obvious over Robinson et al. (US 5,580,532) in view of Myles (US 4,240,833) and Langer (US 5,250,269), as applied to claims 1, 9, 12 and 21, and further in view of Sasaki et al. (JP 07-286514).

Although this is being called a New Grounds of Rejection, the Langer reference has been used before to show what is known in the art. See page 4 of the Final Rejection mailed on May 19, 2010, where it was cited in error as US 5,240,269 rather than US 5,250,269. Furthermore, the Langer reference was cited by Appellants in the IDS filed on April 28, 2000.

(7) Claims Appendix

The examiner has no comment on the copy of the appealed claims contained in the Appendix to the appellant's brief.

(8) Evidence Relied Upon

US 5,580,532	Robinson et al.	12-1996
US 4,240,833	Myles	12-1980
US 5,250,269	Langer	10-1993
JP 07-286514	Sasaki et al.	10-1995

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

1. Claims 1, 2, 5, 6, 8-13, 16, 17, 19-27, 47-50 and 52-57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Robinson et al. (US 5,580,532) in view of Myles (US 4,240,833) and Langer (US 5,250,269).

Regarding claims 1, 8, 9, 12, 19-25, 47, 52, 53, 56 and 57, Robinson et al. (see FIG. 1; column 4, line 55 to column 7, line 40) discloses a device **10** comprising:

a housing **12** having an inlet **14** at one end and an outlet (not shown) at an opposite end through which exhaust gases flow; a fragile structure (i.e., monolith **18**) resiliently mounted within said housing, said fragile structure having an outer surface and an inlet end surface at one end in communication with said inlet **14** and an outlet end surface at an opposite end in communication with said outlet; and a support element (i.e., a mounting mat **20**) disposed between the housing **12** and the fragile structure **18**, said support element **20** comprising an integral, substantially non-expanding ply of polycrystalline ceramic fibers comprising about 40 weight percent to about 60 weight percent alumina and about 60 weight percent to about 40 weight percent silica (see column 5, lines 33-64). The support element **20** further comprises a sacrificial binder (see column 5, lines 33-36; column 6, lines 3-26).

The apparatus of Robinson et al. is the same as the instantly claimed apparatus, except that Robinson et al. is silent as to the ceramic fibers of the support element **20** comprising ceramic fibers which possess the physical properties of fibers that are formed according to the claimed time-temperature heating regimen.

Myles, however, teaches a ceramic fiber, suitable for forming a fiber blanket or mat to be used in a high temperature apparatus (see column 3, line 65 to column 4, line 10), wherein said ceramic fiber is melt-formed and comprises about 40 wt.% to about 60 wt.% alumina and about

60 wt.% to about 40 wt.% silica (see column 2, lines 36-40). The ceramic fiber is prepared according to a time-temperature regimen of heating said fibers to a temperature of 990°C to at least 1050°C for greater than 1 hour, or heating said fibers to a sufficient temperature above the devitrification temperature of the fiber material for an effective amount of time to produce a microcrystalline fiber (see column 3, lines 12-64).

Langer further evidences that the use of melt-formed ceramic fibers for forming support elements in catalytic converters was conventional in the art (see, e.g., column 2, lines 31-50; column 4, lines 27-40).

It would have been obvious for one of ordinary skill in the art at the time the invention was made to substitute the ceramic fibers of Myles for the ceramic fibers present in the support element **20** in the apparatus of Robinson et al., on the basis of suitability for the intended use and absent a showing of unexpected results thereof, because the ceramic fibers of Myles retain sufficient flexibility and show dramatically less shrinkage under high temperature use (see column 6, lines 4-11), and melt-formed ceramic fibers were known to be suitable for forming support elements for catalytic converters, as evidenced by Langer. Furthermore, the substitution of known equivalent structures involves only ordinary skill in the art, and when the prior art that is altered by the mere substitution of one element for another known in the field, the combination must do more than yield a predictable result.

Given that the time-temperature regimen as taught by Myles is identical or substantially identical to the time-temperature regimen being claimed by Applicants, the heat treated ceramic fibers of Myles are presumed to be identical or substantially identical to the claimed ceramic fibers having a crystallite size of greater than 200 Å to about 500 Å, and a crystallinity from

about 5 to 50 percent.

And, even if the properties were not inherent, it would have been obvious for one of ordinary skill in the art at the time the invention was made to select the appropriate time and temperature parameters for producing a ceramic fiber having the instantly claimed physical properties of crystallinity and crystallite size in the modified apparatus of Robinson et al., on the basis of suitability for the intended use and absent a showing of unexpected results thereof, because the specific crystallinity and crystallite size are not considered to confer patentability to the claim since the precise crystallinity and crystallite size would have been considered a result effective variable by one having ordinary skill in the art (see Myles: column 3, lines 21-58). Accordingly, one having ordinary skill in the art would have routinely optimized the heating time and temperature ranges for producing a suitable crystallinity and crystallite size in the polycrystalline ceramic fibers, to obtain the desired flexibility and shrink resistance, for instance, in the support element/mat for holding the fragile structure in Robinson et al., and where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art.

Because the modified apparatus of Robinson et al. comprises all of the instantly claimed components, the support element will inherently exhibit the recited minimum residual pressures for holding the fragile structure within the housing after 200 cycles of testing at 900 ºC or after 1000 cycles of testing at 750 ºC.

Regarding claims 2, 13 and 48, Robinson et al. discloses that the fragile structure **18** has a perimeter, at least a portion of which is integrally wrapped by the support element **20** (see FIG. 1; column 9, lines 26-30).

Regarding claims 5, 6, 16, 17, 49 and 50, Myles further teaches that the ceramic fibers have an average diameter ranging from about 1 micron to about 14 microns, or from about 3 microns to about 6.5 microns (see column 2, lines 50-53).

Regarding claims 10, 11, 26, 27, 54 and 55, Robinson et al. further discloses that the device may comprise a catalytic converter or a diesel particulate trap (see column 4 lines 55-62).

2. Claims 7, 18, 41-44 and 51 are rejected under 35 U.S.C. 103(a) as obvious over Robinson et al. (US 5,580,532) in view of Myles (US 4,240,833) and Langer (US 5,250,269), as applied to claims 1, 9, 12 and 21, and further in view of Sasaki et al. (JP 07-286514).

Regarding claims 7, 18 and 51, Robinson discloses that the ceramic fibers should be substantially shot free, e.g., on the order of about 5 percent nominally or less (see column 5, line 65 to column 6, line 1). Sasaki et al. also teaches a ceramic fiber having a shot content of 5% by weight or less (see section [0007]). It would have been obvious for one of ordinary skill in the art at the time the invention was made to maintain a shot content of less than about 10% in the ceramic fibers forming the support element/mat in the modified apparatus of Robinson et al., on the basis of suitability for the intended use and absent a showing of unexpected results thereof, because when larger amounts of shot are present in the ceramic fiber, the specific gravity of portions of the support element/mat increases, and thermal conductivity becomes uneven, resulting in an inability to evenly hold the fragile structure, as taught by Sasaki et al.

Regarding claims 41-44, the combination of Robinson et al., Myles and Langer fails to disclose the support element/mat being needled. Sasaki teaches a support element/mat comprising ceramic fibers, wherein the support element/mat is needled (para. [0008], [0009]). It would have been obvious for one of ordinary skill in the art at the time the invention was made

to provide needling to the support element/mat in the modified apparatus of Robinson et al., on the basis of suitability for the intended use and absent a showing of unexpected results thereof, because the needling orients some of the fibers in the vertical direction to tightly bind the support element/mat, so that the bulk density of the support element/mat is increased and separation or shifting of the layers of the support element/mat can be prevented, as taught by Sasaki et al.

(10) Response to Argument

1. Comments regarding the rejection of claims 1, 2, 5, 6, 8-13, 16, 17, 19-27, 47-50 and 52-57 under 35 U.S.C. 103(a) as being unpatentable over Robinson et al. (US 5,580,532) in view of Myles (US 4,240,833) and Langer (US 5,250,269).

Response to arguments under Heading A.

Appellant (at page 13, second to last paragraph) argues that the prior art to Robinson et al. does not disclose, suggest, or provide motivation for utilizing "melt-formed" ceramic fibers to prepare the support element of the treatment device because Robinson et al. (at column 5, lines 49-64) only provides examples of ceramic fibers produced according to “sol-gel” processes.

The Examiner respectfully disagrees. Disclosed examples and preferred embodiments do not constitute a teaching away from a broader disclosure or nonpreferred embodiments. See MPEP § 2123. In the instant case, the disclosed examples of ceramic fibers, e.g., as described in the cited patents US 4,159,205 and 4,277,269, are merely exemplary. Based on the broader disclosure, it would have been obvious for one of ordinary skill in the art to select other known ceramic fibers for forming the support element, as long as they met the requirements set forth at, e.g., column 5, lines 50-58 of Robinson et al.

Appellant (at page 13, last paragraph, to page 14, first paragraph) further argues that

Myles fails to provide a teaching or suggestion that its melt-formed ceramic fibers would be functionally equivalent to a sol-gel formed ceramic fiber, or that melt-formed fibers could be used to prepare a mounting mat with suitable holding force properties. Specifically, Appellant argues that Myles teaches ceramic fibers to be used for insulating high temperature furnaces, and therefore, the fibers would not be suitable for exhaust gas treatment applications.

However, the Examiner asserts that one of ordinary skill in the art would have considered melt-formed ceramic fibers to be a suitable alternative to sol-gel formed ceramic fibers for forming support elements for catalytic converters, as evidenced by Langer. In particular, Langer teaches a catalytic converter element comprising a support element formed from melt-formed fibers (see column 2, lines 31-50; column 4, lines 26-40), as an alternative to the sol-gel fibers of the prior art. Thus, it would have been obvious for one of ordinary skill in the art at the time the invention was made to substitute a known melt-formed ceramic fiber, as alternative to the examples of the sol-gel formed ceramic fibers, for constructing the support element for holding the fragile structure in the exhaust gas treatment apparatus of Robinson et al.

Furthermore, it is noted that under the description of the related art (see column 1, line 66 to column 2, line 12), Langer, which disclosure relates to an exhaust gas application, specifically addresses the prior art of Johnson et al. (UK Pat. Spec. No. 1,481,133), which teaches melt-formed ceramic fibers to be used in furnace applications. Thus, one of ordinary skill in the art at the time the invention was made would have considered the teachings of ceramic fiber blankets or mats for furnace applications to be highly relevant to exhaust gas applications.

Appellant (at page 16, second to last paragraph, to page 17, first paragraph), however, argues that Langer and Johnson et al. fail to teach or suggest that the melt-formed fibers of Myles

are capable of being utilized in the exhaust gas treatment device of Robinson et al. In particular, Appellant argues that Langer and Johnson et al. each teach a melt-formed ceramic fiber having a fine-grained crystalline structure, which differs from the instant fibers having a larger grain size.

Appellant’s arguments, however, are not found persuasive, because Langer was merely relied upon to evidence that the use of melt-formed ceramic fibers for forming support elements in catalytic converters was known. Furthermore, as noted in the discussion above, the Johnson et al. citation merely evidences that the teachings of ceramic fiber blankets or mats for furnace applications would be highly relevant to exhaust gas applications. The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art.

Appellant (at page 14, third paragraph to last paragraph) further argues that the only disclosure to use melt-formed and heat-treated ceramic fibers having the presently claimed properties within an exhaust gas treatment device comes from Appellant's specification.

In response to Appellant's argument that the Examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the Appellant's disclosure, such a reconstruction is proper. In the instant case, it would have been obvious for one of ordinary skill in the art at the time the invention was made to substitute the

heat treated, melt-formed ceramic fibers of Myles for the ceramic fibers present in the support element in the apparatus of Robinson et al., because the fibers of Myles retain sufficient flexibility and show dramatically less shrinkage under high temperature use (see column 6, lines 4-11), and melt-formed ceramic fibers were known to be suitable for forming support elements for catalytic converters, as evidenced by Langer.

Furthermore, regarding the citation taken from page 6, lines 12-22, of Appellant's specification, the citation was merely used to show that a ceramic fiber product produced according to Appellant's process, similarly taught by Myles, will inherently exhibit the recited holding pressure. The mere recognition of latent properties in the prior art does not render nonobvious an otherwise known invention, and the fact that Appellant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See MPEP §2145.

Appellant (at page 16, first paragraph) further argues that there would have been no motivation to combine the teachings of Robinson et al. and Myles because the ceramic fiber in Myles "is directed solely for use as furnace insulation". Appellant argues that, "Myles provides no indication that its fiber insulation composition is capable of accommodating the mechanical impact, vibration and the harsh environmental conditions which the mounting mat/support element of Robinson and the present application is designed to withstand, or that a mounting mat having the required minimum holding force could be prepared from the fibers."

The Examiner respectfully disagrees. Myles (at column 3, line 65 to column 4, line 2) merely states that the melt-formed and heated ceramic fiber may form part of a fiber blanket or mat, and such blankets or mats are "usually used for insulating high temperature apparatus <u>such</u>

as high temperature furnaces." Thus, the intended use of the fiber blanket or mat as a furnace insulation is merely exemplary, and the disclosed blanket or mat could be used in other high temperature apparatuses.

In addition, Robinson et al. (see column 3, lines 40-39; column 2, lines 38-61) discloses that the characteristics which enable a mounting mat to operate successfully within a catalytic converter, e.g., in an automotive environment, include: i) good handleability and fabrication characteristics; ii) the capability to withstand high temperatures without degradation while maintaining stable pressure over a wide range of operating temperatures, e.g., from a low temperature of about 20 °C to high temperatures of at least about 1200 °C; and iii) flexibility without the need of additional means to maintain structural integrity.

Myles teaches ceramic fibers which may be formed into a mat or blanket, and the mat or blanket can be bent in an arc without producing significant cracking or breakage of the fibers (see column 2, lines 23-28; column 3, line 65 to column 4, line 10). Myles also teaches that the ceramic fibers are able to withstand high temperatures without degradation, given its ability to withstand temperatures of up to 1425 °C for 24 hours with minimal shrinkage (see column 2, lines 29-35). Given these properties, the Examiner asserts that one of ordinary skill in the art would have expected a blanket or mat produced from the melt-formed and heat treated ceramic fibers of Myles to perform satisfactorily in the exhaust gas environment of Robinson et al.

Appellant (at page 17, middle of page, to page 18, last paragraph) further argues that there would have been no motivation to add a binder because Myles teaches the fiber to be sufficiently flexible without the addition of a binder.

The Examiner respectfully disagrees. The primary reference to Robinson et al. discloses

a binder (see column 5, lines 33-36; column 6, lines 3-26) to facilitate the formation of the ceramic fibers into a mat structure, e.g., using conventional paper making techniques, wherein the binder comprises a sacrificial binder that is burned out of the mounting mat, leaving only the ceramic fibers in the final mounting mat product. (see column 5, lines 33-49; column 6, lines 3-46). Although the Myles fibers may be sufficiently flexible, it would have been obvious for one of ordinary skill in the art at the time the invention was made to include a binder in order to further facilitate the formation of the ceramic fibers into the mat structure. Langer similarly evidences that it was known to add a sacrificial binder during the formation of a ceramic fiber mat so that the fiber mat is easier to handle, in comparison to a fiber mat formed without binder (see column 3, lines 18-30; i.e., "A binder can be avoided by wet-laying the fibers to align most of the fibers in the plane of the heat-insulating mat, *but such a mat can be difficult to handle*.").

Response to arguments under Heading B.

Appellant (at page 19, first paragraph, to page 20, last paragraph) argues that there would have been no reasonable expectation of success from combining the prior art of Robinson and Myles. In particular, Appellant argues that,

> "Myles is directed to a refractory fiber for use as furnace insulation. A furnace is a static structure that is commonly used in a controlled environment. Myles does not teach that the fiber disclosed is useful in any application other than furnaces, or that the fiber might be used in mechanically demanding environments, such as in automotive exhaust gas treatment devices." (page 19, second paragraph).
>
> "Additionally, Myles does not disclose that the fibers have the mechanical properties needed during normal operation in the environments described in Robinson, namely, catalytic converters and diesel particulate traps. The environments described in Robinson are far more mechanically demanding environments than are furnaces, as the

> Robinson devices are commonly subject to mechanical impact, vibration, multi-axial loading, and fatigue that would be extremely unusual for furnaces. Accordingly, a person of ordinary skill in the art would not have reason to automatically assume that the fibers of Myles can withstand more demanding mechanical conditions than those for which they were designed or intended." (page 19, third paragraph).

The Examiner respectfully disagrees. As discussed above, Myles (at column 3, line 65 to column 4, line 2) states that the melt-formed and heated ceramic fiber may form part of a fiber blanket or mat, and such blankets or mats are "usually used for insulating high temperature apparatus <u>such as</u> high temperature furnaces." Thus, the intended use of the fiber blanket or mat as a furnace insulation is merely exemplary, and the disclosed blanket or mat could be used in other high temperature apparatuses.

Furthermore, Robinson et al. (see column 3, lines 40-39; column 2, lines 38-61) discloses that the characteristics which enable a mounting mat to operate successfully within a catalytic converter, e.g., in an automotive environment, include: i) good handleability and fabrication characteristics; ii) the capability to withstand high temperatures without degradation while maintaining stable pressure over a wide range of operating temperatures, e.g., from a low temperature of about 20 °C to high temperatures of at least about 1200 °C; and iii) flexibility without the need of additional means to maintain structural integrity.

Myles teaches ceramic fibers which may be formed into a mat or blanket, and the mat or blanket can be bent in an arc without producing significant cracking or breakage of the fibers (see column 2, lines 23-28; column 3, line 65 to column 4, line 10). Myles also teaches that the ceramic fibers are able to withstand high temperatures without degradation, given its ability to withstand temperatures of up to 1425°C for 24 hours with minimal shrinkage (see column 2,

lines 29-35). Given these properties, the Examiner asserts that one of ordinary skill in the art would have expected a blanket or mat produced from the melt-formed and heat treated ceramic fibers of Myles to perform satisfactorily in the exhaust gas environment of Robinson et al.

Response to arguments under Heading C.

Appellants arguments (at page 22, second paragraph) with respect to the sol-gel fibers of Miyahara et al. (US 4,159,205) and Sweeting (US 4,277,269) have been noted, but the discussion is not relevant to the rejection under §103 because the rejection is based on the combination of Robinson et al. and Myles.

Appellant (at page 22, last paragraph, to page 23, third paragraph) further argues that Myles fails to teach or suggest that the fibers would be capable of providing the minimal holding force required for holding a fragile structure within a housing of an exhaust gas treatment device, since the Myles ceramic fibers are intended for furnace insulation.

The Examiner respectfully disagrees. As discussed above, Myles (at column 3, line 65 to column 4, line 2) states that the melt-formed and heated ceramic fiber may form part of a fiber blanket or mat, and such blankets or mats are "usually used for insulating high temperature apparatus such as high temperature furnaces." Thus, the intended use of the fiber blanket or mat as a furnace insulation is merely exemplary, and the disclosed blanket or mat could be used in other high temperature apparatuses.

Furthermore, Robinson et al. (see column 3, lines 40-39; column 2, lines 38-61) discloses that the characteristics which enable a mounting mat to operate successfully within a catalytic converter, e.g., in an automotive environment, include: i) good handleability and fabrication characteristics; ii) the capability to withstand high temperatures without degradation while

maintaining stable pressure over a wide range of operating temperatures, e.g., from a low temperature of about 20 °C to high temperatures of at least about 1200 °C; and iii) flexibility without the need of additional means to maintain structural integrity.

Myles teaches ceramic fibers which may be formed into a mat or blanket, and the mat or blanket can be bent in an arc without producing significant cracking or breakage of the fibers (see column 2, lines 23-28; column 3, line 65 to column 4, line 10). Myles also teaches that the ceramic fibers are able to withstand high temperatures without degradation, given its ability to withstand temperatures of up to 1425 °C for 24 hours with minimal shrinkage (see column 2, lines 29-35). Given these properties, the Examiner asserts that one of ordinary skill in the art would have expected a blanket or mat produced from the melt-formed and heat treated ceramic fibers of Myles to perform satisfactorily in the exhaust gas environment of Robinson et al.

Appellant (on page 23, second to last paragraph, to page 24, first paragraph) further argues that the holding pressure of the claimed mounting mat is not inherent in the prior art, and "[r]esistance to shrinkage is a different and independent property of the material than its ability to provide sufficient holding pressure. The holding pressure of the support element *is a result of the heat treatment* so that the support element does not experience a permanent compression set." However, it is noted that the ceramic fibers of Myles are subjected to the same heat treatment claimed by Appellant. Thus, it would appear that a support element formed from the melt-formed and heat treated ceramic fibers of Myles would likewise exhibit the claimed holding pressure without experiencing a permanent compression set. The mere recognition of latent properties in the prior art does not render nonobvious an otherwise known invention, and the fact that Appellant has recognized another advantage which would flow naturally from following the

suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See MPEP §2145.

Appellant (at page 24, second to last paragraph, to page 25, second paragraph) further argues that the claimed crystallinity, crystallite size and holding pressure would not be inherent of the ceramic fibers of Myles, and that one of ordinary skill in the art would not have considered the crystallinity and crystallite size in the fibers to be a result effective variable.

The Examiner respectfully disagrees and maintains that the claimed characteristics would be inherent of the Myles fibers. The ceramic fiber of Myles has the same composition as Appellant's fibers and is produced according to Appellant's same process – namely, the ceramic fiber is melt-formed and comprises about 40 wt.% to about 60 wt.% alumina and about 60 wt.% to about 40 wt.% silica (see column 2, lines 36-40), and the ceramic fiber is prepared according to a time-temperature regimen of heating said fibers to a temperature of 990°C to at least 1050°C for greater than 1 hour, or heating said fibers to a sufficient temperature above the devitrification temperature of the fiber material for an effective amount of time to produce a microcrystalline fiber (see column 3, lines 12-64). Given that the time-temperature regimen as taught by Myles is identical or substantially identical to the time-temperature regimen being claimed by Appellants, the recited crystallite size of greater than 200 Å to about 500 Å, and the recited crystallinity from about 5 to 50 percent are presumed to be inherent of the ceramic fiber.

Furthermore, the "holding forces" or "minimum residual pressure for holding said fragile structure within said housing" as recited in the claims would be an inherent or latent property of a support element formed from the ceramic fiber produced according the processes specified in the claims. This is further evidenced by Appellant's specification, at page 6, lines 12-22, which

states that, "*When such fibers are employed*, the support mat provides a minimum pressure for holding the fragile catalyst within the housing of at least one of i) at least 4 psi after at least 200 cycles and/or after 1000 ºC of testing at 900 ºC or ii) at least about 10 psi after at least 1000 cycles of testing at 750 ºC."

The instant claims recite product-by-process limitations. Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a *prima facie* case of either anticipation or obviousness has been established. When the PTO shows a sound basis for believing that the products of the Appellant and the prior art are the same, the Appellant has the burden of showing that they are not. Therefore, the *prima facie* case can be rebutted by evidence showing that the prior art products do not necessarily possess the characteristics of the claimed product. It is noted that Appellant has not provided any evidence showing that a support element formed from the melt-formed and heat treated ceramic fibers of Myles would not posses the instantly claimed characteristics.

Furthermore, the Examiner maintains that one of ordinary skill in the art would have considered the crystallinity and crystallite size in the ceramic fibers to be a result effective variable. For example, Myles (see column 3, lines 35-58) teaches,

> "The preferred sufficient temperature is therefore between 1050 ºC and 1240 ºC. At temperatures above 1240 ºC, the crystal structures become rapidly too large thus making the fiber brittle… Sufficient time and sufficient temperature are inversely independent thus the higher the sufficient temperature, the shorter the sufficient time which is required to form microcrystals. Times should not be used which are sufficiently long to cause macrocrystal formation in the fiber which cause embrittlement; therefore, after a fiber is held at the sufficient temperature for a sufficient time to cause microcrystal

growth, the fiber is cooled below 960 °C before macrocrystals can form.

Accordingly, one having ordinary skill in the art would have routinely optimized the heating time and temperature ranges for producing a suitable crystallinity and crystallite size in the ceramic fibers, without forming macrocrystals which cause fiber embrittlement, to obtain the desired flexibility and shrink resistance in the support element/mat for holding the fragile structure in Robinson et al., and where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art.

2. Comments regarding the rejection of claims 7, 18, 41-44 and 51 under 35 U.S.C. 103(a) as obvious over Robinson et al. (US 5,580,532) in view of Myles (US 4,240,833) and Langer (US 5,250,269), as applied to claims 1, 9, 12 and 21, and further in view of Sasaki et al. (JP 07-286514).

Appellant (beginning on page 25, last paragraph) argues that the combination of Robinson et al., Myles and Sasaki et al. is improper because, "Sasaki teaches away from the combination with Myles." In particular, Appellant notes that Sasaki teaches a ceramic fiber composition with a weight ratio of Al_2O_3:SiO_2 that must be maintained within the range of 70:30 – 74:26. On the other hand, Myles teaches a ceramic fiber composition containing about 40 to about 65 weight percent Al_2O_3 and from about 35 to about 60 weight percent SiO_2. Appellant argues that the references to Sasaki and Myles teach away from one another because the ranges of weight percent alumina and the ranges of weight percent silica as taught by the two references are mutually exclusive. (see page 26, second to last paragraph, to page 27, last paragraph). In addition, Appellant (at page 28, first paragraph) argues that the rejection is improper, since it is impermissible for the Examiner to "pick and choose from any single reference" while ignoring

the reference in its totality.

The Examiner respectfully disagrees. The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art.

With respect to claims 7, 18 and 51, the Sasaki reference was merely relied upon to provide additional support to the Robinson reference for maintaining a minimal shot content in the ceramic fibers (see Robinson: column 5, line 65 to column 6, line 1; and Sasaki: paragraph [0007]). It would have been obvious for one of ordinary skill in the art at the time the invention was made to maintain a shot content of less than about 10% in the ceramic fibers forming the support element/mat in the modified apparatus of Robinson et al., because when larger amounts of shot are present in the ceramic fiber, the specific gravity of portions of the support element/mat increases, and thermal conductivity becomes uneven, resulting in an inability to evenly hold the fragile structure, as taught by Sasaki et al. (para. [0007]). Also, it is noted that increased shot contributes to fiber breakage (i.e., since the shot functions as a fulcrum).

Furthermore, with respect to claims 41-44, the Sasaki reference was merely relied upon to teach the conventional practice of needling a support element (see paragraphs [0008], [0009]). It would have been obvious for one of ordinary skill in the art at the time the invention was made to provide needling to the support element/mat in the modified apparatus of Robinson et al., because the needling orients some of the ceramic fibers in the vertical direction to tightly bind the support element/mat, so that the bulk density of the support element/mat is increased and

separation or shifting of the layers of the support element/mat can be prevented.

Appellant (at page 28, last paragraph, to page 29, first paragraph) further argues that Sasaki provides no teaching or suggestion for altering the time-temperature conditions of processing the fibers having the disclosed shot content to enable the creating of a fiber having a different composition ratio than that disclosed by Sasaki. However, Appellant's argument is not found persuasive because the rejection did not intend to modify the time-temperature conditions of the Sasaki reference. Sasaki was merely relied to upon to provide the generally known teachings that i) a minimal shot content is desirable, and ii) the needling of fibers increases the bulk density of a support element and prevents the separation or shifting of the fiber layers.

Appellant (at page 30, last paragraph, to page 31, first paragraph) further argues that, "it is unlikely that a person of ordinary skill in the art at the time of the invention would look to Sasaki to deduce any advantages that reducing the shot content of the fibers of Myles may have on improving the holding force of the Myles fibers when used within an exhaust gas treatment device when Myles does not even address support elements or mounting mats for exhaust gas treatement devices. Thus, there is no reasonable basis upon which to base a prediction that reducing the shot content of the fibers in Myles in such applications would succeed."

The Examiner respectfully disagrees. Shot is recognized as the unfiberized material of a ceramic fiber. Robinson et al. discloses that the ceramic fibers for forming the support element should be "substantially shot free, having very low shot content, generally on the order of about 5 percent nominally or less." (see column 5, line 65 to column 6, line 1). Sasaki further teaches that the shot content of a ceramic fiber should be minimized, e.g., to 5% by weight or less, for at least the reason that shot is known to contribute to ceramic fiber breakage (i.e., the shot functions

as a fulcrum on the fiber), and thus the mat will lose retaining strength. Shot also contributes to uneven thermal conductivity, which results in an inability to evenly hold a honeycomb catalyst (see para. [0007]). Given that Myles is similarly concerned with the formation of a ceramic fiber mat which is capable of exhibiting sufficient flexibility without significant breakage of the fibers (see, e.g., column 2, lines 23-28), it would have been obvious for one of ordinary skill in the art at the time the invention was made to maintain a minimal shot content in the fibers of Myles, as used in the apparatus of Robinson et al., because it was known that an increased shot content contributes to fiber breakage and a loss in retaining strength, as taught by Sasaki.

(11) Related Proceeding(s) Appendix

Copies of the court or Board decision(s) identified in the Related Appeals and Interferences section of this examiner's answer are provided herein.

For the above reasons, it is believed that the rejections should be sustained.

This examiner's answer contains a new ground of rejection set forth in section **(9)** above. Accordingly, appellant must within **TWO MONTHS** from the date of this answer exercise one of the following two options to avoid *sua sponte* **dismissal of the appeal** as to the claims subject to the new ground of rejection:

(1) **Reopen prosecution.** Request that prosecution be reopened before the primary examiner by filing a reply under 37 CFR 1.111 with or without amendment, affidavit or other evidence. Any amendment, affidavit or other evidence must be relevant to the new grounds of rejection. A request that complies with 37 CFR 41.39(b)(1) will be entered and considered. Any request that prosecution be reopened will be treated as a request to withdraw the appeal.

(2) **Maintain appeal.** Request that the appeal be maintained by filing a reply brief as set

forth in 37 CFR 41.41. Such a reply brief must address each new ground of rejection as set forth in 37 CFR 41.37(c)(1)(vii) and should be in compliance with the other requirements of 37 CFR 41.37(c). If a reply brief filed pursuant to 37 CFR 41.39(b)(2) is accompanied by any amendment, affidavit or other evidence, it shall be treated as a request that prosecution be reopened before the primary examiner under 37 CFR 41.39(b)(1).

Extensions of time under 37 CFR 1.136(a) are not applicable to the TWO MONTH time period set forth above. See 37 CFR 1.136(b) for extensions of time to reply for patent applications and 37 CFR 1.550(c) for extensions of time to reply for ex parte reexamination proceedings.

Respectfully submitted,

/JENNIFER A LEUNG/
Primary Examiner, Art Unit 1774

A Technology Center Director or designee must personally approve the new ground(s) of rejection set forth in section (9) above by signing below:

/ROBERT J. WARDEN, Sr./
Supervisory Patent Examiner, Art Unit 1700

Conferees:

Walter D. Griffin /WG/
Supervisory Patent Examiner, Art Unit 1774

/ROBERT J. WARDEN, Sr./
Supervisory Patent Examiner, Art Unit 1700